

## SOME NEW ALYSSA FROM THE NEAR EAST

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In the course of a study of this genus from Turkey, the author had occasion to examine much material from other areas in the Orient. The three new species and three new varieties described in this paper are the direct conclusions of this auxiliary study of extra-Turkish material. Acknowledgement is especially due Dr. P. H. Davis for his advice and patience, and Miss Rosemary Smith for so skilfully executing the illustrations.

Sect. PSILONEMA (C. A. Meyer) Hooker fil.

**A. dasycarpum** Steph. in Willd. Sp. Pl., 3(1), 469 (1800).

var. **dasycarpum** (Fig. 1B)

Syn.: *Psilonema dasycarpum* (Steph.) C. A. Meyer in Ledebour, Fl. Alt., 3, 50 (1831)!

*Isotype*—Russia: in Siberia ad Kamam et Volgam fluvium, *Stephen* (K!BM!).

var. **minus** Bornm. ex Dudley, var. **nov.** (Fig. 1A).

Syn.: *A. dasycarpum* Steph. var. *minus* Bornm. in exsicc.

A typo caulibus valde reductis fragilibus e basi ramosis, caulibus floriferis arcuatis vel ascendentibus pumilis 2.5–5 cm. longis, corymbis paucifloris vix elongatis, foliis minutis orbiculato-spatulatis (nec oblanceolato-obovatis) 2–3-plo minoribus 5–10 mm. longis 2–5 mm. latis, floribus et siliculis duplo minoribus recedit. Fl. Mar.

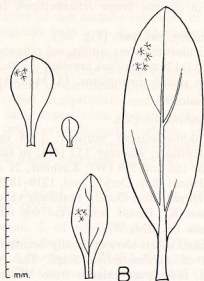


FIG. 1. *Alyssum dasycarpum* Steph. A, largest and smallest leaf of *A. dasycarpum* Steph. var. *minus* Bornm. ex Dudley. B, largest and smallest leaf of *A. dasycarpum* Steph. var. *dasycarpum*.

IRAN. Inter Ispahan et Hamadan, ad pagum Mohammadi, 1800 m., 17 Mar. 1892, *Bornmüller* 2174 (holo. E, iso. K, BM, OXF, W, G). Inter Ispahan et Yesd ad Bambis, 1900 m., 26 Mar. 1892, *Bornmüller* 2173 (G). Ad Kom, 1100 m., 4 Mar. 1892, *Bornmüller* 2175 (E, K, BM, OXF, W, G). In collibus prope Dalechi, Mar. 1842, *Kotschy* 181 (K, BM, G-Herb. Boiss. as *A. szowitsianum* pro parte). In arid. collibus Uenak pr. Teheran, 24 Apr. 1843, *Kotschy* 64 (W). Karawanseri, Kaswin, Iter Polak, 30 Apr. 1892, *Pichler* (K, W, G). Hills south of Tabriz, 9 Apr. 1926, *Gilliat-Smith* 1356 and 1381 (K); *ibid.*, May 1927, *Gilliat-Smith* 1783 (K).  
 SYRIA. Desert, Nebk to Quaryatein, 5 Apr. 1890, *Post* (BM).

This variety was apparently growing under similar environmental conditions to *A. desertorum* var. *prostratum* in the same area of Iran, and accordingly the general comments given under the latter apply also to *A. dasycarpum* var. *minus*.

#### Sect. ALYSSUM

*A. desertorum* Stapf in Denksch. Math-Naturwiss. Classe Kaiser. Akad. Wissen., 51 (2), 34 (1886).

var. *desertorum* (Fig. 2B)

Syn.: *A. minimum* Willd., Sp. Pl., 3 (1), 464 (1800) pro parte, non Linnaeus, Sp. Pl., 2, 651 (1753)!

*A. vindobonense* Beck, Fl. Nieder Österr., 469 (1893).

*A. minimoides* Pau in Trab. Mus. Nat. Cienc. Nat. Madrid, ser. Bot., 14, 15 (1918)!

*A. desertorum* var. *persicum* Prodan in Contrib. Bot. Cluj, 1, (17), 4 (1930)!

*A. desertorum* var. *ponticum* Prodan, op. cit., 4!

*A. desertorum* var. *rossicum* Prodan, op. cit., 3!

Syntype—Persia: in desertis prope Jelizabethpol, Iter Polak, 5 Apr. 1882, *Pichler* (W!).

var. *himalayensis* Dudley, var. nov. (Fig. 3C).

Typo habitu et siliculorum forma similis, sed pilis stellatis minutissimis appressis (radiis 6–10 (–12) aequalibus brevibus 0.2–0.3 mm. diam.) serie singula ad marginem siliculi distinguitur. Fl. Mar.–Apr.; fr. Apr.–Mai.

TIBET. Hügel 1191 (holo W).

TURKESTAN. 1871, *Fedschenko* (W).

INDIA. Kashmir, Takht-i-Suliman Srinagar, 1704 m., 20 May 1940, *Pinfold* 101 (BM); Kashmir, *Falconer* 152 (W); in siccis ad summ. mt. Kashmir, *Jacquemont* 168 and 398 (W); Kashmir, 21 Apr. 1848, *Hooker fil. & Thomson* (K). Himal. Bor. Occid., Jsed, 1219–1829 m., *Hooker fil. & Thomson* (E, BM); Himal. Bor. Occid., Peshawin valley, 3–6 May 1848, *Hooker fil. & Thomson* (K); Himal. Bor. Occid. reg. temp. 1230–1845 m., *Hooker fil. & Thomson* (K, BM, W).

All of the above-cited sheets were originally determined as *A. minimum* Willd., a synonym of *A. desertorum* Stapf. The typical, completely glabrous-fruited var. *desertorum* extends from Western Europe to the Balkans, Turkey, Caucasus, the Russian steppes, Iraq, Iran, Afghanistan and Pakistan. A closely related taxon found only in Afghanistan, *A. afghanicum* Rechinger fil. (*A. turkestanicum* Regel & Schmalh.?), has a

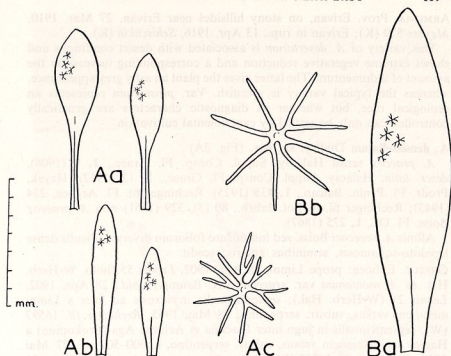


FIG. 2. A, *Alyssum desertorum* Stapf var. *prostratum* Dudley. Aa, lower leaves. Ab, upper leaves. Ac, stellate hairs of leaf (not to scale). B, *A. desertorum* Stapf var. *desertorum*. Ba, leaf. Bb, stellate hair of leaf (not to scale).

dense to sparse indumentum of short, few-rayed stellate hairs similar to var. *himalayensis*, but on the entire surfaces of both fruit valves. The row of delicate stellate hairs along the fruit margin of var. *himalayensis* is the most distinctive feature of this easterly extension of *A. desertorum*, and therefore morphologically links it to *A. afghanicum*.

**var. *prostratum* Dudley, var. nov. (Fig. 2A)**

Syn.: *A. desertorum* Stapf forma *prostrata* Bornm. in exsicc.

A typo habitu pumilo procumbenti, pluriramoso, caulibus 1.2–6 cm. longis, foliis inferioribus longipetiolatis spatulatis acutis (8–) 10–20 mm. longis 2.5–3 mm. latis, superioribus angustis oblanceolatis 3–6.5 mm. longis 1–1.5 mm. latis, corymbis valde confertis, indumento per totam plantam denso cinereo e pilis stellatis minoribus valde appressis composito, floribus et fructibus multo minoribus differt. Fl. Feb.–Mar.; fr. Mar.–Apr.

IRAN. Ad Teheran in desertis, c. 1200 m., 26 Feb. 1892, Bornmüller 2170 (holo E, iso. K, BM, OXF, W, G).

IRAQ. Near Shahraban, S. of Jebel Hamour, on dunes of blown sand, 11 Apr. 1957, *Hunting Technical Services Ltd.* 17 (K). Mt. Elwend, 2153 m., 1 Apr. 1929, *Cowan & Darlington* 373 (K). 39 miles west of Kermanshah, 1384 m., 29 Mar. 1929, *Cowan & Darlington* 2623 (K). 39 miles east of Kermanshah, 1384 m., 29 Mar. 1929, *Cowan & Darlington* 2620 and 2612 (K). Tak-i-Bustam, 1384 m., 27 Mar. 1929, *Cowan & Darlington* 2625 and 505 (K).

ARMENIA. Prov. Erivan, on stony hillsides near Erivan, 27 Mar. 1910, *Meyers* 579 (K); Erivan in rup., 13 Apr. 1916, *Schischkin* (K).

This variety of *A. desertorum* is associated with desert conditions and shows extreme vegetative reduction and a corresponding increase in the amount of indumentum. The latter gives the plant an ashy grey appearance, whereas the typical variety is greenish. Var. *prostratum* represents an ecological race, but whether its diagnostic characters are genetically controlled can only be settled by experimental cultivation.

***A. densistellatum* Dudley, sp. nov. (Fig. 3A)**

*A. praecox* sensu Halácsy, Suppl. Consp. Fl. Graec., 1, 9 (1908), *descr. latin.* Halácsy, Suppl. Consp. Fl. Graec., 2, 12 (1912). Hayek, Prodr. Fl. Penin. Balcan., 1, 435 (1925). Rechinger fil. Fl. Aegaea, 224 (1943); Rechinger fil. in Bot. Jahrb., 80 (3), 329 (1961)—non *A. praecox* Boiss. Fl. Or., 1, 275 (1867).

Affinis *A. praecoci* Boiss. sed indumento foliorum diverso, siliculis dense lepidoto-squamosis, seminibus apteris recedit.

GREECE. Euboea: prope Limni, 18 Apr. 1902, *Leonis* 55 (holo. W-Herb. Hal. as *A. montanum* var. *graecum*, det. Baumg.); *ibid.*, 28 Apr. 1902, *Leonis* 21 (W-Herb. Hal.); septentrionalis in saxosis ad litus a Limni meridiem versus, substr. serpentino, 28 Mai. 1955, *Rechinger fil.* 16593 (W); septentrionalis in jugo inter Psachna et Achmet Aga (Prokopion) a Hagios septentrionem versus, substr. serpentino, c. 300–500 m., 27 Mai 1955, *Rechinger fil.* 16512 (W, K); pr. Limni, serpentine, 300–700 m., 21 Jul. 1956, *Rechinger fil.* 18236 (W, K); in cacumine Mt. Dirphys, 18 Mar. 1910, *Tuntas* 925 (W-Herb. Hal.).

The specimen chosen as holotype for this new species, in conjunction with the other *Leonis* sheet cited above, formed the basis of Halácsy's description. Superficially this taxon from Euboea resembles *A. praecox* Boiss. (originally described from the Cilician Taurus of Turkey) in habit and in the size and shape of leaves and fruit. The species name—*densistellatum*—aptly applies to the indumentum of the fruit (Halácsy writes "siliculis . . . lepidotis") which furnishes the major differential character between *A. praecox* Boiss. and the new species. The fruits of *A. praecox* bear sparse, few-rayed, and distinct stellate hairs (Boissier writes . . . "siliculis glabrescentibus . . ."), rather than a dense indumentum of overlapping, lepidote stellate hairs. The seed of *A. praecox* may have a membranous wing of varying width, but that of *A. densistellatum* is completely wingless, contrary to Halácsy's observation in his description. Another important difference between these two species illustrated in Fig. 3A is the different form of the stellate hairs on the leaves. The larger stellate hair of *A. densistellatum* is coarse and strongly punctuate with a diameter of 0.7–1 mm. and fewer, longer branches, whereas the lepidote scale of *A. praecox* has many, short branches and a diameter of 0.3–0.4 mm.

Sect. ODONTARRHENA (C. A. Meyer) Koch

***A. subspinosum* Dudley, sp. nov. (Pl. 6)**

Ab omnibus aliis speciebus in Sectione *Odontarrhena* ("Elatiores") habitu fruticoso rigido ramulis ultimis subspinosis facile distinguitur. Ut videtur affinis *A. haradjantii* Rechinger fil. et *A. murali* W. & K. sed ab ambobus habitu diversissimo, foliis acutis utrimque ob indumento denso

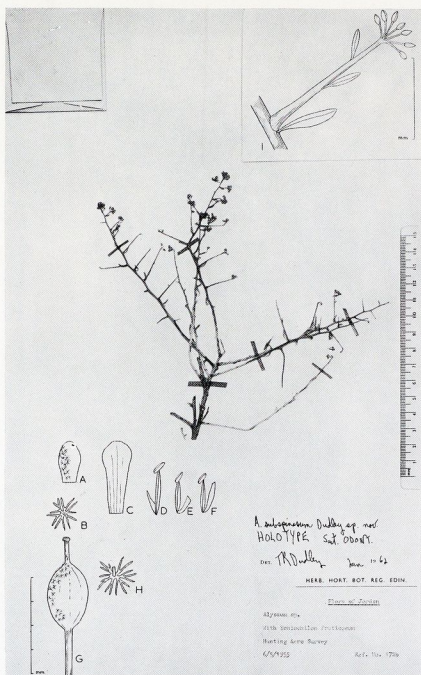


PLATE 6. *Alyssum subspinosum* Dudley, A, sepal. B, stellate hair on sepal (not to scale). C, petal. D, long stamen. E, short stamen. F, short stamen. G, fruit. H, stellate hair from fruit (not to scale). I, ultimate inflorescence in bud.



PLATE 7. *Alyssum penjwinensis* Dudley (holotype). Above, fertile stems; below, sterile rosette.



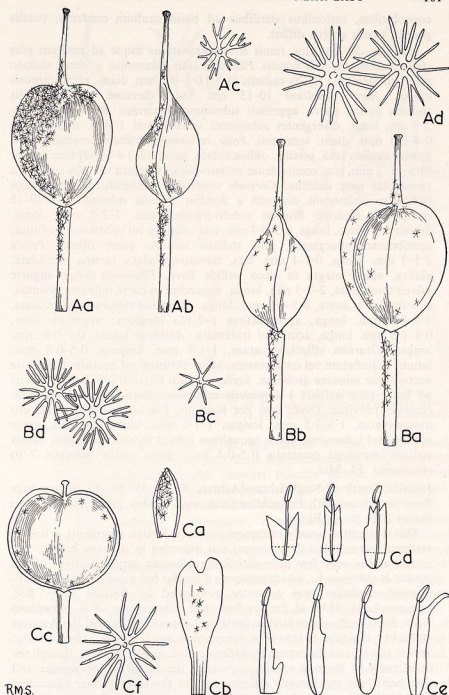


FIG. 3. *Alyssa densistellatum* Dudley, Aa, fruit,  $\times 6$ . Ab, fruit,  $\times 6$ . Ac, fruit stellate hair,  $\times 40$ . Ad, stellate hair of leaves on sterile shoot,  $\times 40$ . B, *A. praecox* Boiss. Ba, fruit,  $\times 6$ . Bb, fruit,  $\times 6$ . Bc, stellate hair of fruit,  $\times 40$ . Bd, stellate hair of leaves on sterile shoots,  $\times 40$ . C, *A. desertorum* Stapf var. *himalayensis* Dudley. Ca, sepal,  $\times 9$ . Cb, petal,  $\times 18$ . Cc, fruit  $\times 6$ . Cd, short stamens,  $\times 14$ . Ce, long stamens,  $\times 14$ . Cf, stellate hairs on leaf,  $\times 40$ .

concoloribus, turionibus sterilibus ad basin caulium confertis, petalis glabris, ovulis apteris differt.

*Frutex* c. 20 cm. alta, ramis stricte patentibus usque ad medium pilis stellatis albo-argenteis vestitis. *Planta* ex toto indumento  $\pm$  dense stellato pilis appressis (9-) 15-20-radiatis (0.3-) 0.5-0.7 mm. diam. radiis ramosis obsita. *Rami penultimi* 10-13 cm. longi flexuose angulati pilis stellatis paucis parvis appressis subcanescenti-virides. *Rami ultimi* 1.3-2.5 cm. longi, divergentes subspinosi spiculo basi 1 mm. diam. apice 0.4-0.5 mm. diam. terminati. *Folia turionum steriliu*m densissime disposita, caulina laxa, sessilia, oblanceolata, acuta, (2-) 4-6 (-9) mm. longa, (0.5-) 1-2 mm. lata, omnia dense stellato-pilosa argentea vel folia superiora virescentia mox decidua. *Corymbi* simpliciter umbelliformes ad apices ramosum ultimorum dispositi e floribus pallidis minutis (5-) 10-15 compositi. *Pedicelli* floriferi subdivergento-erecti, 2-2.5 mm. longi. *Sepala* 1.5-2 mm. longa, 0.5-0.7 mm. lata, elliptica vel subobovata, obtusa, membranaceo-marginata, pilis stellatis minutis parce obsita. *Petala* 2.5-3 mm. longa, 0.7-1 mm. lata, clavato-spatulata, lamina rotundata, glabra, apice integra in sicco pallide flava. *Filamenta longa* anguste bilateraliter alata, 2-2.5 mm. longa, appendice in parte inferiore connata, superne libra, acuta, 0.5-0.8 mm. longa. *Filamenta minora* anguste alata, 1.5-1.8 mm. longa, appendicibus 1-2-plo longiora; appendix libra, 0.8-1.5 mm. longa, acuta vel tridentata. *Antherae* luteae, 0.7-0.8 mm. longae. *Ovarium* elliptico-ovatum, 1-1.5 mm. longum, 0.5-0.8 mm. latum, subinflatum vel compressum, apice obtusum vel acutum. *Glandulae* nectariferae minutae globosae. *Stylus* in statu florendi 0.6-1 mm. longus ad basin pilis stellatis 1-4 minutis appressis obsitus, stigmatibus globosis capitato provisus. *Ovula* una per loculum. *Fructus* in statu immaturo uniseminatus, 1.5-2.5 mm. longus, 1-1.5 mm. latus, ellipticus, apice obtusus vel subacutus, valvis aequalibus inflatis indumento e pilis densis stellatis manifeste punctatis 0.3-0.4 mm. diam. radiis brevibus 7-10 composito. Fl. Mai.

JORDAN. South of Nagb Ishtar [Ashtar, 30° N, 35° 30' E], almost bare Ram sandstone, with *Echiochilon fruticosum*, 6 May 1955, *Hunting Aero Survey* 172b (holo. E).

This distinctive woody chamaephyte from Jordan represents a line of extreme xeromorphic development not observed in *Alyssum* before, and is one of the very few perennial Saharo-Sindian representatives of the genus. *A. spinosum* L., which possesses a similar but more extreme branch-thorned condition, was correctly transferred by Boissier (Voy. Bot. Espagne 2, 46, 1837) to *Pilotrichum*. The indumentum of *A. haradjianii* Rech. fil., which occurs farther north in Lebanon, Syria and the Amanus of Turkey, is similar to that of *A. subspinosum* and indicates a close affinity. This is also true of the extremely widespread *A. murale* W. & K. though the floral parts of the new species, especially the filament appendages and their teeth, are significantly different, as are the several other characters cited in the diagnosis which distinguish *A. subspinosum* from its allies.

**A. penjwinensis** Dudley, sp. nov. (Pl. 7, fig. 4)

Syn.: *A. rhodopense* Form. ssp. *duristellatum* Nyárády, Synopsis Odontarrhenae in Anal. Acad. Repub. Popul. Romane Sect. Ştinte Geogr. Şc. Biol., ser. A, 1, mem. 3, 77 (1949)!



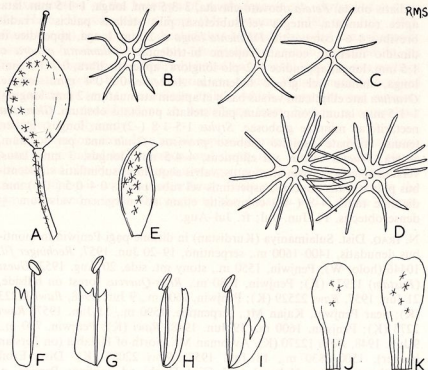


FIG. 4. *Alyssum penjwinensis* Dudley, A, fruit,  $\times 6$ . B, stellate hair of fruit,  $\times 40$ . C, stellate hair of leaf on fertile stem,  $\times 40$ . D, stellate hair on leaf of sterile stem,  $\times 40$ . E, sepal,  $\times 8$ . F, G, long stamens,  $\times 12$ . H, I, short stamens,  $\times 12$ . J, K, petals,  $\times 9$ .

Affinis *A. constellato* Boiss. sed habitu diverso, foliis surculorum steriliu orbiculato-spatulatis dense argenteo-incanis, corymbis majoribus laxe pyramidalibus multo ramosis ramulis ultimis subscendentibus, pedicellis distantibus patentissimis, petalis sparse stellato-pilosis (nec glabris), siliculis compressis latius ellipticis, ovulis apteris differt.

*Herba* perennis, suffrutescens, hemisphaerica, a basi multiramosa, 18–25 cm. alta et lata. *Caules floriferi* stricti patentim ascendentes, a basi rubro-purpureo pilis stellatis parcis tecti. *Surculi steriles* basales, insignes, breviter patentim rosuliferi. *Folia caulium floriferorum* virescentia, obovata vel oblanceolata, acuta, (10–) 15–20 mm. longa, (2–) 3–6 mm. lata, summum versus sensim increscentia, pilis paucis stellatis punctatis 0.4–0.5 mm. diam. e radiis longis delicatis 4–6 compositis obsita. *Folia surculorum steriliu* crassa; inferiora oblanceolata, 10–20 mm. longa, 4–7 mm. lata, pilis stellatis  $\pm$  parcis 0.4–0.5 mm. diam. 6–10–radiatis radiis ramosis; superiora obovato-spatulata, 5–10 mm. longa, 3–6 mm. lata, pilis densis argenteo-lepidotis appressis manifeste punctatis 0.5–0.7 mm. diam. 10–20–radiatis radiis ramosis vestita. *Corymbi* laxi, magni, obpyramidales, 7–10 cm. alti et lati, ramulis ultimis subhorizontalibus 2.5–5 cm. longis. *Pedicelli* patentissimi vel deflexi, 3.5–4.5 mm. longi, inter se 3–5 mm. distantes, indumento eo fructuum simili. *Sepala* subsistentia, subcucullata, acuta, membranaceo-marginata, 2–2.5 mm. longa, 1–1.5 mm. lata, ovata vel elliptica, pilis stellatis parcis 4–6–

radiatis obsita. *Petala* obovato-clavata, 3-3.5 mm. longa, 1-1.5 mm. lata, apice rotundata, integra vel subretusa, pilis stellatis paucis e radiis brevibus 4-6- compositis. *Filamenta longa* c. 2 mm. longa, appendice in dimidio inferiore connata superne bi-tridentata. *Filamenta minora* c. 1.5 mm. longa, appendice 1-2-plo longiora; appendix libra, 0.7-1.5 mm. longa, minute vel grosse bidentata. *Antherae* 0.3-0.4 mm. longae. *Ovarium* late ellipticum versus basin et apicem attenuatum, 2 mm. longum, 1-1.5 mm. latum, compressum, pilis stellatis punctatis obsitum. *Glandulae* nectariferae minutae globosae. *Stylus* 1.5-1.8 (-2) mm. longus, glaber, tenuis, stigmatibus capitato globoso provisus. *Ovula* una per loculum, aptera. *Fructus* ovatus vel ellipticus, 4-4.5 mm. longus, 3 mm. latus, versum apicem et basin attenuatus, valvis aequalibus subinflatis virescentibus pilis stellatis punctatis asperrimis vel subappressis 0.4-0.5 (-0.6) mm. diam. e radiis 4-8 (-10) compositis etiam ad marginem valvarum  $\pm$  dense obtectis. Fl. Jun.-Jul; fr. Jul-Aug.

N. IRAQ. Dist. Sulaimaniya (Kurdistan) in ditone pagi Penjwin in montibus denudatis, 1400-1600 m., serpentino, 19-20 Jun. 1957, *Rechinger fil.* 10446 (holo. W); Penjwin, 1550 m., stony mt. side, 20 Aug. 1953, *Guest (Rustam)* 12971 (K); Penjwin, 1280 m., *Rhus-Quercus* forest on hillside, 21 Jun. 1957, *Rawi* 22529 (K); Penjwin, 1600 m., 9 Jun. 1948, *Rawi* 12223 (K); near Penjwin, Kajan Mt., serpentine, 1590 m., 21 Jun. 1957, *Rawi* 2273 (K); Penjwin, 1600 m., 19 Jun. 1948, *Rawi* (K); Penjwin, 700 m., 9 Jun. 1948, *Rawi* 12270 (K). Avroman Mt., north of Halabja (on Persian border), 1500-1830 m., 18 Jun. 1957, *Rawi* 22083 (K). Dist. Erbil (Kurdistan), Mons Helgurd (Arl Gird Dag) ad confines Persiae, c. 36° 40'N, 44° 50'E, in valle supra pagum Nowanda, c. 2000-2600 m., 10-14 Aug. 1957, *Rechinger fil.* 11361 (W); Arl Gird Dag, Gasharm, 1829 m., 21 Jul. 1932, *Guest (Rustam)* 2818 (K); valley east of Arl Gird Dag, 2100 m., *Astragalus* thorn cushion on igneous or metamorphic rock, *Gillett* 9502 (K). Erbil liwa, Mergadereija near Haji Omran, 1800-1900 m., 21 Jun. 1947, *Rawi* 9145 (K); valley between Gundashar and Darbad, 1400 m., 25 Aug. 1948, *Gillett* 12402 (K). Gara Dag, 1500-1700 m., near *Quercus libani*, 26 Jun. 1947, *Rawi* 9263 (K).

Blackelock in the Kew Bulletin 1955, p. 521, cites many of the specimens of *A. penjwinensis* under *A. singarense*. He points out, however, that "Gillett and Rawi's specimens are not a perfect match for Haussknecht's gathering which has a denser indumentum on all parts". His illustration of the fruit is definitely of *A. singarense* Boiss. & Hausskn. and could not be interpreted to represent *A. penjwinensis*. Earlier, in the enumeration of the Rustam herbarium (Kew Bulletin 1948, p. 384), Blackelock cited the sheets collected by Guest as "*Alyssum* sp.", and commented that the silicles resemble those of *A. lanigerum* DC but the racemes are longer and more slender; he considered it to be probably a form of that species.

This author feels that any affinity which *A. penjwinensis* shows to *A. lanigerum* or *A. singarense* is remote, even though the three species may occur in the same general area of northern Iraq. However, Nyárády's conclusion of a close affinity to *A. rhodopense* Form. seems equally unlikely. Quite apart from morphological details, this theory is weakened by the fact that *A. rhodopense*, originally described from the Rhodope mountains of Bulgaria, has never been recorded east of the Bosphorus.

Examination of the holotype of *A. rhodopense* ssp. *duristellatum* from the Herb. Haussknecht in Jena (Mt. Avroman, 1580 m., July 1867, *Haussknecht*) has clearly indicated that Nyárády intended the subspecific name to be *duristellatum* not "*duristellalum*" which appeared in his *Synopsis Odontarrhenae*. Nyárády noted on his label that this was perhaps a separate species, but more material was needed. Haussknecht determined this specimen as "*A. anatolicum* mihi", which, however, was certainly not what he considered as *A. anatolicum* from Turkey, a name later validated by Nyárády.

The collections from Iraq are all copiously branched from the base, have a lax obpyramidal inflorescence, and distinctive, silvery, rosulate sterile shoots, and clearly represent a new species in Section *Odontarrhena*. Its closest affinity is with *A. constellatum* Boiss. which occurs rarely in the same area and extends westwards to the Amanus and Cilician Taurus.